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EDUCATION.

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THE ultimate aim of medical education is to fit those who enter upon the study of medicine to prevent and cure disease and to relieve suffering. For the proper accomplishment of this work, several things are necessary :

1. A sufficient development of the faculty of observation and of the reasoning faculty to enable the person to judge of cause and effect, and to draw proper conclusions from ascertained facts.

2. An ability and a willingness to work.

3. A knowledge of the work done by others directly or indirectly connected with medical matters.

4. A just appreciation of the extent and character of the work that they undertake and of the responsibility that they assume.

I propose to consider in this paper the importance of these different subjects, and shall endeavor to show by what methods the mental training and

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discipline of a medical student may be best accomplished.

Let me say in the beginning, however, that, in considering the requirements of those entering upon the study of medicine, I have in view the great numbers who yearly enter our lecture-rooms with very moderate intellectual capacity, scant literary training, and often the most deplorable ignorance of the gravity of the task and the responsibility on which they are entering. These are the men and women who treat the great masses of our people, and who need, therefore, the best medical education and training which can be given them.

I recognize the fact—so encouraging to all who are interested in higher medical education—that among those entering upon the study of medicine, there is from year to year a larger and larger number whose minds have been broadened and enlightened by preliminary training and who are thoroughly alive to their own responsibility and the needs of humanity; but the medical teacher should always keep in mind the needs and requirements of the *average* medical student, and not of the favored few who by reason of natural ability or superior preliminary training will overcome all obstacles and far outstrip their less favored associates.

I have stated briefly the chief requisites of those entering upon the study and practice of medicine. The next question that presents itself is: What are the best means of attaining these requisites? I shall consider this question under the following headings:

1. The studies calculated to develop the faculty of *observation*.

2. The studies calculated to develop the *reasoning faculties*.

3. The order in which the various branches of medicine should be studied.

4. The time that should be given to laboratory work and lectures each day.

5. The value and importance of didactic lectures and of daily recitations.

6. The objects and methods of clinical instruction.

7. The importance of a high standard of graduation in medical colleges, with especial reference to the character of the work to be done by the graduate in after-life.

1. *The studies calculated to develop the faculty of observation.* No argument would seem to be necessary to show the importance of a habit of careful observation of details in the study and practice of medicine; yet it is surprising to see how many persons, well educated in other respects, are woefully deficient in this. It would take me beyond the scope of this paper to consider, except in the most cursory manner, the means by which the faculty of observation is to be developed before the study of medicine is entered upon. Yet it is a matter of the utmost importance, especially at the present time when so many institutions of learning are arranging the studies in their academic courses, with reference to the subsequent professional studies of the student.

The *academic* studies that seem to me of most importance for this purpose are geology, zoölogy, and botany, especially the last. All of these branches

of study necessitate the most careful observation of details, but botany is of especial value because of its intimate connection with bacteriology.

When the study of medicine itself is entered upon, chemistry, anatomy, histology, bacteriology are the studies that necessitate careful observation, and are therefore of the utmost importance, not only on account of their intrinsic value, but as a means of mental training and discipline as well. There are of course other subjects that necessitate careful observation—indeed, all branches of knowledge do—but those named seem to me the most useful for developing this faculty in the medical student.

2. *The studies calculated to develop the reasoning faculties.* The *academic* studies that are valuable for developing the reasoning faculties and that are of especial value to those who propose to enter upon the study of medicine are physics and logic. I do not mean to exclude mathematics from this list, but I have not named it specifically because, to some extent at least, it is a subject studied by all, and its value for purposes of mental discipline is universally recognized. Nor would I underrate the value of the languages—ancient and modern—not only on account of the wide field that they open up for instruction and entertainment, but because of the broadening influence that they exert upon the mental faculties. I am old-fashioned enough to believe even in the study of Greek, not only for its own sake but for its influence upon the intellectual faculties as well. Still it seems to me that no other academic studies are as useful to develop the reasoning faculties of the student who proposes to enter

upon the study of medicine, as those first named—physics and logic.

The medical studies proper that are most useful for this purpose are physiology and pathology viewed in its broader aspect. I shall speak of this more in detail when I come to consider the value of didactic lectures.

3. *The order in which the various branches of medicine should be studied.* There is but little difference of opinion at the present day on this point, and it is almost universally conceded that *some* knowledge at least of chemistry, anatomy, normal histology and physiology is absolutely necessary before the student can profitably engage in the study of the so-called *practical* branches.

A few colleges, I believe, still expect the student to begin his medical studies with the daily attendance upon lectures on anatomy, chemistry, physiology, materia medica, obstetrics, practice, surgery, and perhaps a number of special subjects, but the number of these schools is growing rapidly less, and it is almost certain that in a short time all medical schools that are worthy of the name will adopt a graded course and give the student some time for study outside of the lecture-room.

4. *The time that should be given to lectures and laboratory work each day.* Not many years ago the students in many, if not most, medical schools were expected to attend lectures from 8 or 9 A.M. till 5 or 6 P.M., with an intermission for dinner of one hour. The dissections were to be made at night. It is hard to conceive how the intellectual faculties of a student could be developed by this process.

Mental confusion and physical fatigue would combine to retard rather than aid the development of these faculties. Three hours a day, at most, is all the time, it seems to me, that should be required of the student so far as listening to didactic lectures is concerned; and scarcely any more time should be given to laboratory instruction, if both didactic lectures and laboratory instruction are given on the same day.

From four to six hours more, the time depending on the physical health and mental training of the student, might be profitably spent in carefully reading in some good text-books the subjects of the lectures of the day and comparing what has been seen in the laboratory with the teachings of those who are specially skilled in laboratory work.

I do not speak here of clinical instruction; I shall allude to that briefly a little later on. I need only say just now that it seems to me far better that the undergraduate should see a *few* cases daily and study them *thoroughly*, than that he should have his mind crowded with different subjects, none of which can be properly digested.

5. *The value and importance of didactic lectures and of daily recitations.* There is at present a manifest tendency to do away in great part with the old-fashioned didactic lectures, and to substitute for them laboratory and clinical work on the one hand and the reading of judicious text-books on the other. Nor can it be denied that the change has been of immense value to medical education; but I am firmly convinced that on many branches of medicine didactic lectures, if properly given, are of great

value as a means of education—that is, as a means of making men *think* and *reason* for themselves. For example, in the study of the practice of medicine, with all the excellent books on the subject, none can or does explain the connection between morbid anatomy, causes, symptoms, etc., as is done in the didactic lecture, nor can an author emphasize in a text-book the points that may be of especial moment without making the book of inordinate length. I would offer an earnest plea, then, for the retention of didactic lectures as a means of *education*—of teaching men to think—not to the exclusion of other methods, but as a valuable adjuvant thereto.

Then there is another means of instruction which I believe to be of inestimable value, but that unfortunately cannot be thoroughly applied in large medical schools—I mean daily recitations on the subject of the previous lecture. These recitations are a means of instruction to both teacher and pupil; the teacher learns from them what points he has failed to make clear, and the student is taught not only what he had failed to catch before, but something far more important than that—the necessity for careful and thorough study and preparation. Much as I value the didactic lecture as a means of instruction, or rather of *education*, if I were compelled in my own teaching to abandon it or the daily recitations, I would unhesitatingly discard the didactic lecture, for in the course of the recitations nearly all the explanations needed could be given.

6. *The objects and methods of clinical instruction.* There are two objects to be attained by clinical instruction: the first, which is of great importance to

the student, is the *method of conducting the examination* of a patient; and the second is to teach the symptoms and signs of diseased conditions.

For the attainment of these objects it is essential that the student should not only see examinations made by others, but that he should see and hear and feel for himself. It is equally important, too, that the student should understand the significance of what he does see and hear, and for this reason it seems to me far better that the undergraduate at least should see but a few cases a day, and should be required to study them *thoroughly*, both at the bedside and in the text-books.

Another point seems to me of the greatest importance in connection with clinical instruction, namely, that the student should have been thoroughly drilled in the *principles* of medicine before he begins to study cases, so that he can understand the significance of the various symptoms and signs, and their connection with the morbid changes in the body.

For example, how can a student *understand* the passive hyperemia and dropsy of advanced cardiac disease, who knows nothing of the anatomy and physiology of the heart and vessels, and how can he apply the proper treatment unless he has studied the pathology of the process and the action of drugs?

7. *The importance of a high standard of graduation in medical schools, with especial reference to the character of the work to be done by the graduate in after-life.* If I may judge from my own observations and conversations I have had with a number of physicians who are interested in medical education, the importance of a high standard of graduation on

the subsequent work of the student is not appreciated as it should be. It goes without saying that a man with very scant knowledge of medicine is not a suitable person to intrust with the health and lives of his fellow-creatures, but it seems to be a common impression that the defects and deficiencies of early training will be corrected by the experience of subsequent practice. Doubtless this in a measure is true; but there is another side to the subject which I believe to be equally true and of vast importance in medical education, namely, that the graduates of a school having a high standard of graduation will have a higher aim and do better work all through life than the graduates of a school having as good or better facilities for instruction, but whose requirements for graduation are relatively low. My attention was first called to this matter in 1885, when the graduates of a number of different schools appeared before me, as a member of the Board of Medical Examiners of Virginia, to undergo their "State examination." It was a matter of profound astonishment to me and to my colleagues on the Board to see the *superficial* character of the answers given to many of the questions by men of good sense, fair general education, and graduates of schools having admirable facilities for instruction, and whose faculties would compare favorably with any in the world.

I well remember the surprise depicted on the faces of some of these young men who were rejected, and the statement made by some of them that they had "never been taught that all these details were necessary in medicine"! The superficial character of the

answers sometimes received and accepted may be judged also by the questions asked. I know of an instance, for example, in which in a written examination on anatomy, lasting two or three hours, one of the six questions was, "Describe the alimentary canal and its appendages." Now, how can a young man of average capacity be expected to learn *thoroughness* when the questions given him on examination are of such a character that only the most superficial answers can be given? How can earnest, painstaking, careful, and thorough work be expected of him in after-life when his training has been such as to encourage the reverse, and that training has been received from men of acknowledged ability and experience?

In conclusion, then, I would plead most earnestly for a higher standard of graduation, not only because it necessitates more knowledge of medical matters when the student graduates, but because it gives him a keener sense of the gravity of the duties that he has assumed and of the responsibilities that rest upon him.

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